


Friday September 8 Meeting Minutes (and More)

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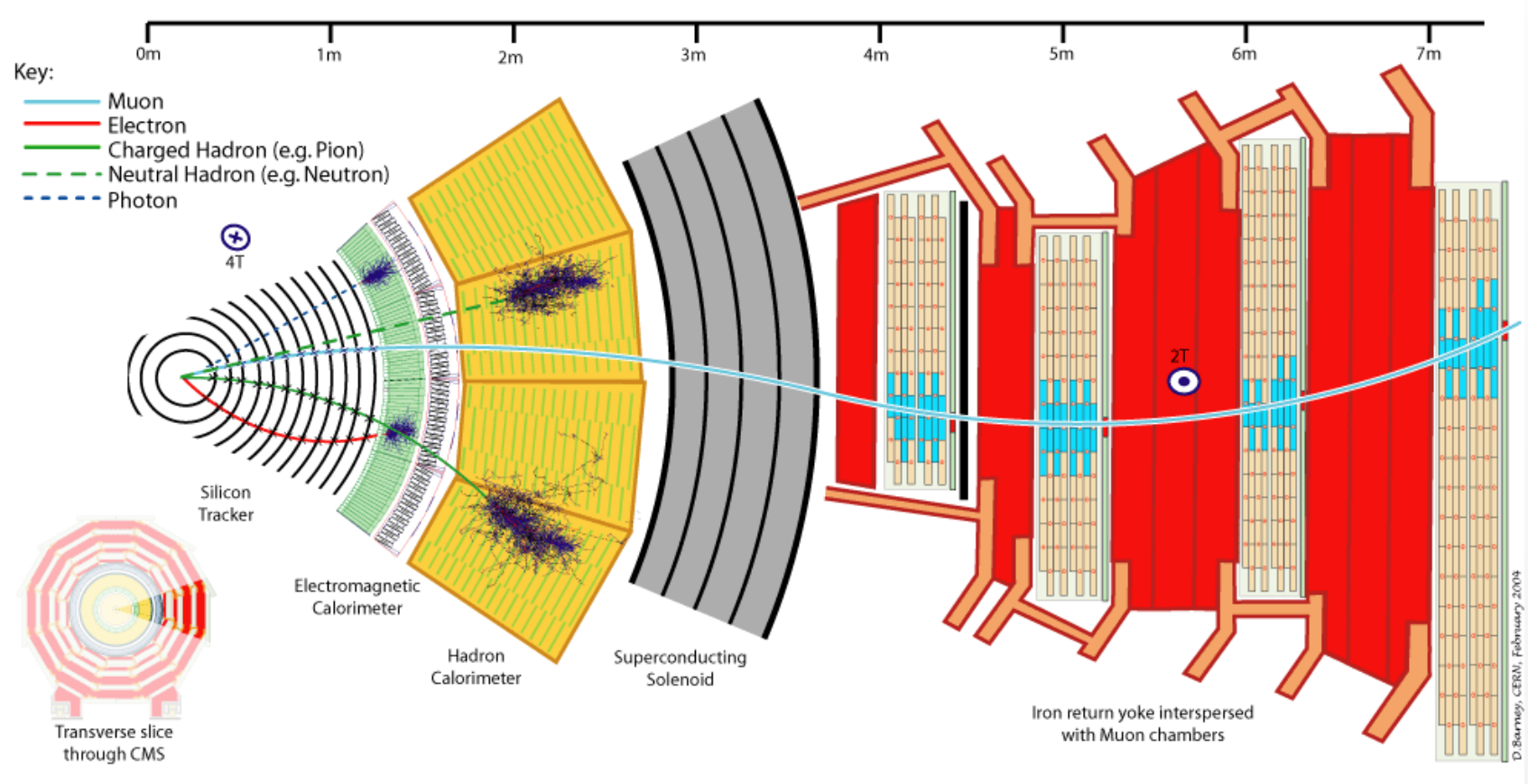
Available Projects, as we now understand them

- "DetLayers" and "MeasurementDet" are more abstract-coding projects than physics projects
- "Regional track reconstruction" (RegionalTrack) narrowing the search for *silicon* tracks for HLT speed
- "Propagation" (Propagation) three algorithms, one is finished and another is "almost finished"
- "L2MuonReconstruction" (L2Seeding) seeding stand-alone muon tracks with L1 muon objects for speed in HLT (a slower seeding algo already exists)

We are interested in RegionalTrack or L2Seeding because work is just beginning. These are both HLT projects.

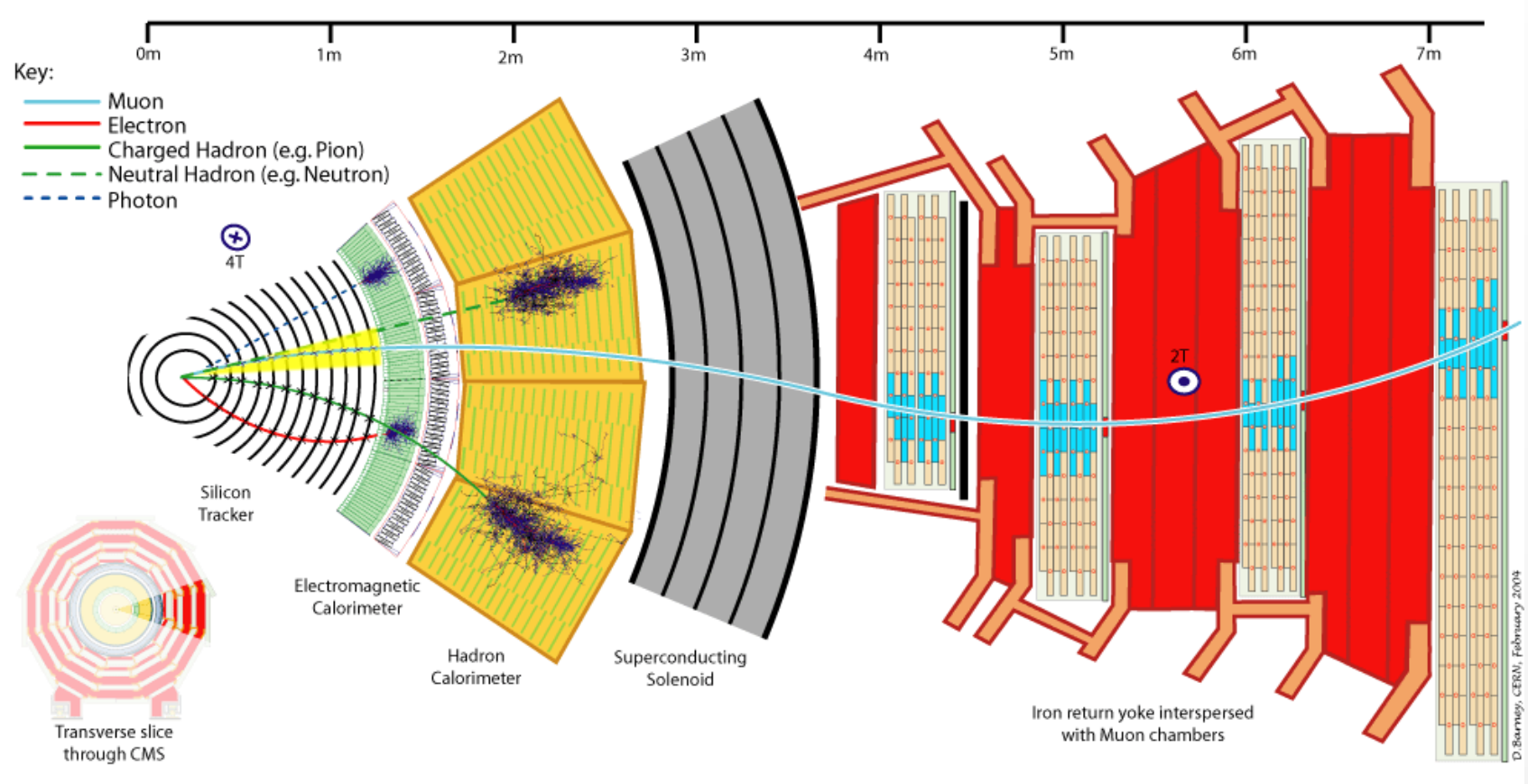
RegionalTrack



$\delta p_T/p_T$ is 1.0 to 1.5% for global 10 GeV tracks

$\delta p_T/p_T$ is 8 to 15% for muon-only 10 GeV tracks

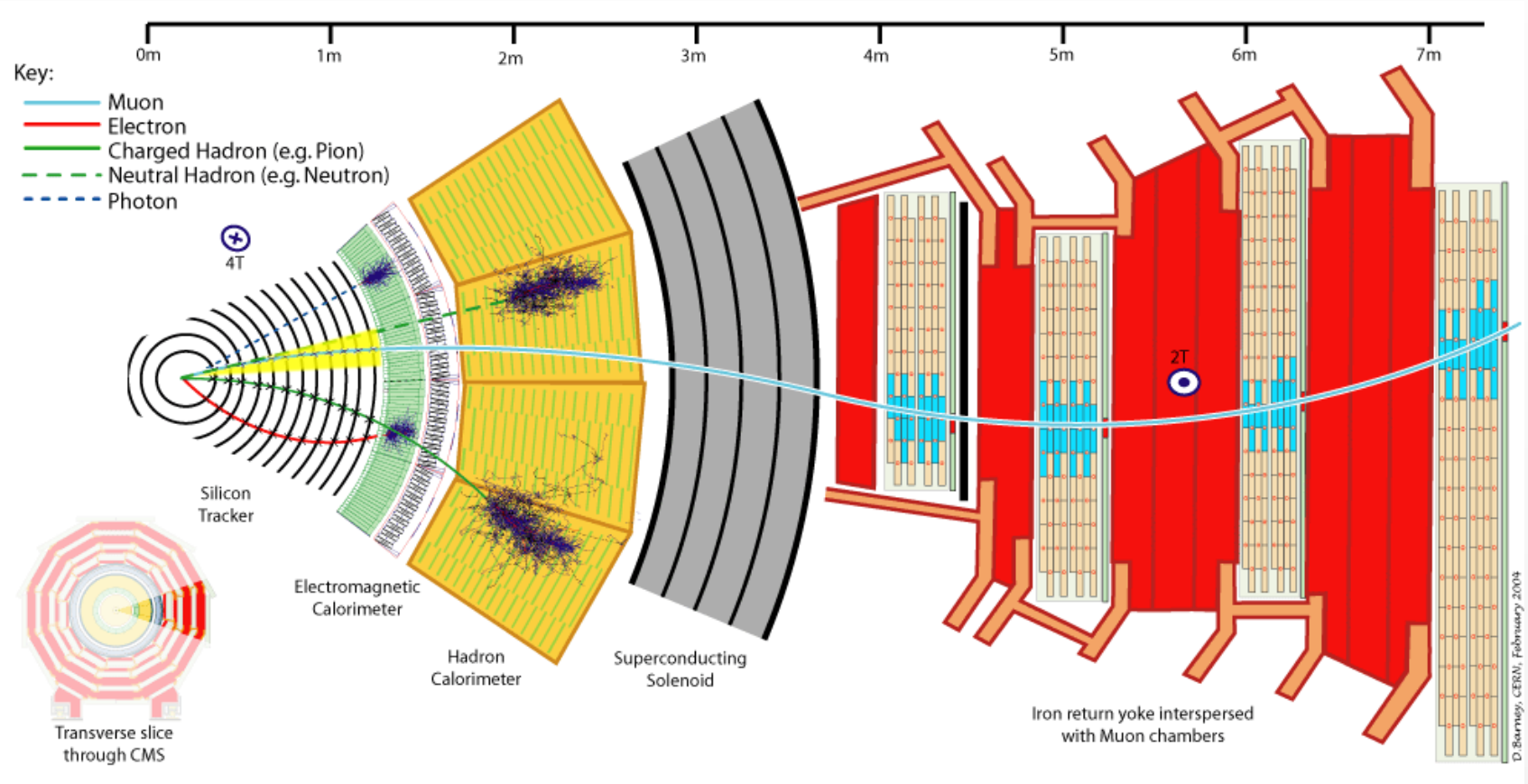
RegionalTrack



Road width in silicon is about 20 cm (yellow)

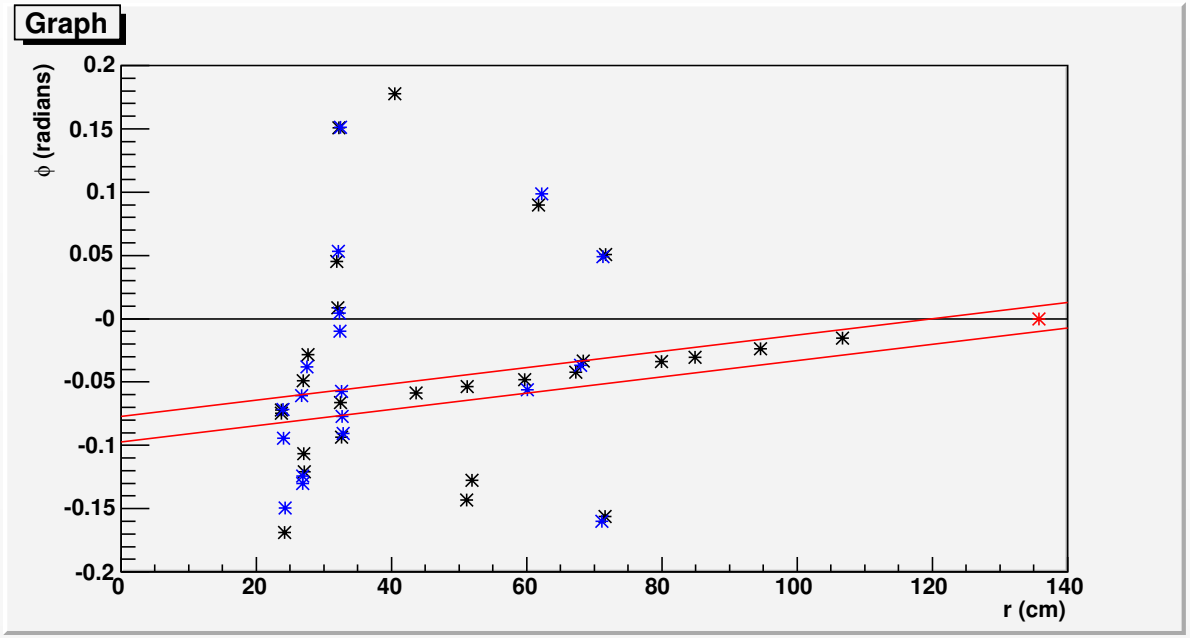
"track *should* be unique. . ."

RegionalTrack



Not rejecting spurious muon signals by checking for *existence* of silicon track; we want to reject real, low-momentum muons.

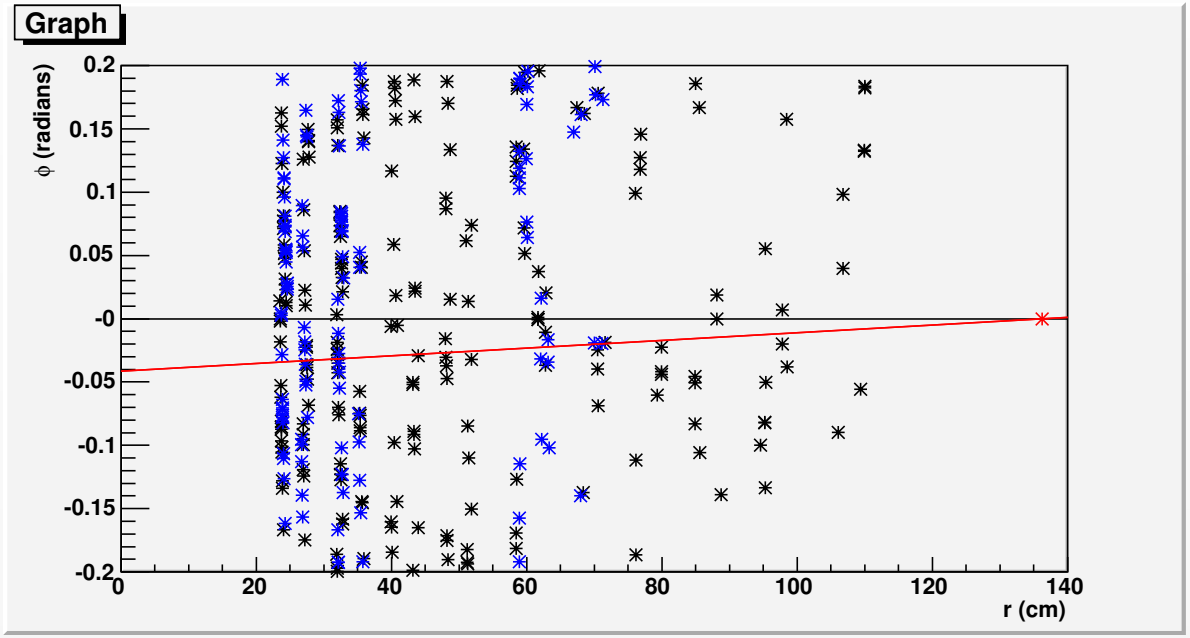
RegionalTrack: What this looked like in ECAL



20 cm = 0.17 rad

- Black: rphi silicon-strip hits, Blue: stereo silicon-strip hits
- Red: ECAL SuperCluster and projection into tracker
- 10 GeV electron-gun with underlying event (simulated by ONE minbias)
- vertical axis is ϕ position of the HIT, horizontal is radius

RegionalTrack: What background looked like



20 cm = 0.17 rad

- Black: rphi silicon-strip hits, Blue: stereo silicon-strip hits
- Red: ECAL SuperCluster and projection into tracker
- 20 GeV SuperCluster from a minbias event (jet pointing at calorimeter)
- vertical axis is ϕ position of the HIT, horizontal is radius

RegionalTrack

The point is to sharpen resolution for a p_T cut *before* doing full tracking. Therefore, it must be significantly faster than full tracking. It also must cut out enough background:

> **The non-linear problem** *(from ECAL experience): Suppose the speed and background rejection of an algorithm are inversely related. The "slow and thorough" extreme may be too slow, while "fast and dirty" lets in too much background and may be too slow downstream. Optimum balance is dictated by physics distributions!*

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Propagation

Three implementations:

Slava's SteppingHelixPropagator completed (send him bug reports!), fast, hard-coded geometry, hard to update, used now in MTCC

Runge-Kutta (a.k.a. STEP?, "Navigation geometry propagator"?) almost finished, not debugged

GEANT4 "is slow." We don't know who's working on it.

A lot of work has already been done; we'll probably pass.

L2Seeding

To seed stand-alone muon tracks, we currently throw away Level1 muon trigger info and work from muon hits

Issues:

1. HLT would be faster if we take advantage of Level1 info
2. easier to estimate trigger efficiency if high-level muons correspond to trigger muons in some way

All that needs to be done is to write a producer which turns L1 muons into L2 TrackingSeeds? And then study the performance?

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